

18. Air Quality and Smoke Management

Air pollution over the Forest is a regional scale phenomena caused by many sources from many states. Sources of air pollution are found outside the Forest boundaries and from within. Notable sources within the Forest include wildfires and certain CNF management activities, particularly prescribed burning.

Key Points

- Based on current understanding, air pollution is not degrading forest ecosystems, human health or enjoyment of forest resources except for the following areas: visibility and mercury deposition. None of the important sources of visibility impairment or mercury deposition are related to National Forest management activities.
- The Forest is meeting the desired conditions, objectives, standards and guidelines.

Monitoring Question

To what extent is Forest management contributing or responding to air quality effects on ecosystems, human health or human enjoyment?

Results

The Forest does not directly support any permanent air quality monitoring on the Forest, other than hosting a precipitation monitoring site at the Marcell Experimental Forest. The Forest has access to other air quality monitoring data gathered by other agencies.

Air pollution from Forest management activities represents a very small source to the Forest's annual air pollutant concentrations, with the exception of the largest prescribed burning projects but even these only affect air quality over a limited area and for a short time period. Fire staff has tools to help them determine whether a burn they are planning has the potential to emit air pollutants in a large enough quantity that it may adversely impact the public. For the largest burns fire staff has smoke management tools to help mitigate the effects of smoke.

Air quality impacts measured on the Forest are dominated by sources outside the Forest. Air quality is affected by large air masses moving across the entire State. For example, in the Minnesota Pollution Control Agency's (MPCA) Regional Haze plan, all air emission sources in Minnesota are responsible for only 28% of the fine particulate pollution that cause visibility impairment at the Boundary Waters Canoe Area Wilderness (BWCAW). For mercury, the MPCA estimates that the state is responsible for 10% of the deposition that contributes to elevated concentrations of mercury in fish (<http://www.pca.state.mn.us/publications/wq-iw4-01b.pdf>).

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Visibility is categorized as impaired at legally protected (Class I) areas in the State such as the BWCAW and Voyageurs National Park. Even though the Forest does not have legally protected vistas it has many large lakes where visibility is an important recreational attribute. According to the MPCA none of the important sources of visibility impairment are related to National Forest management activities.

Mercury is a chemical that is of concern because it can concentrate in food chains to levels that can damage nervous systems, especially those that are developing such as those of young children and fetuses. Once released to the environment mercury is never destroyed, but can cycle through many different pools (such as the air, soil, water, plants, animals), and change chemical forms, until it is eventually buried in deep soils and sediments (EPA, 1997).

Mercury contamination of fish is a well documented problem in Minnesota. Because of widespread mercury contamination, the Minnesota Department of Health advises people to restrict their consumption of large sport fish from all lakes and rivers. More than 95 percent of the mercury in Minnesota surface water comes from the atmosphere. In 2007, the EPA accepted Minnesota's mercury Total Maximum Daily Load (TMDL) plan that concludes that atmospheric mercury deposition must be reduced by 65 percent to achieve compliance with aquatic mercury standards. Many water bodies on the CNF are listed as impaired by MPCA due to mercury contamination of fish. Since a portion of the deposition is natural, and hence uncontrollable, the MPCA is targeting a 93% reduction in mercury emissions to the atmosphere from Minnesota sources.

Implications

- Based on current understanding, air pollution is not degrading forest ecosystems, human health or enjoyment of forest resources except for the following areas: visibility and mercury deposition. None of the important sources of visibility impairment or mercury deposition are related to National Forest management activities.
- The Forest is meeting the desired conditions, objectives, standards and guidelines.

Recommendations

- Continue to monitor air quality data gathered by other agencies for changes in conditions or trends.
- The Forest should coordinate with the Great Lakes Air Quality specialist (T. Wickman) to monitor smoke emissions during prescribed burns.

Additional information can be found in the project file and is available upon request. This review provides updates to information provided in the 2009 report. Readers are encouraged to refer to the *Air Quality* section of the *2009 Monitoring and Evaluation Report* which is posted on our webpage for a more complete discussion. Updates of the graphs included in the *2009 Monitoring and Evaluation Report* are in the project file and are available upon request.